The Giovanni News

August 2015

From the Editor:

Hello again. This will be a short end-of-summer newsletter, in preparation for a longer September issue, where we'll describe many new features in Giovanni-4, as well as the progress on the Federated Giovanni project.

You may notice a slightly different look for this issue; I'm trying out composing it in Mircosoft Powerpoint, rather than Word, so that I can have more formatting flexibility. See what you think of it.

In this issue, we'll have a short summary of a published paper, found during the July compilation, that includes some "friends of Giovanni" as authors; an illustrated discussion of increased color palette availability in G4; and our monthly slogan.

Thanks,
Jim Acker, *The Giovanni News* Editor

Paper Summary:

Saharan dust as a causal factor of hemispheric asymmetry in aerosols and cloud cover over the tropical Atlantic Ocean. Pavel Kishcha, Arlindo da Silva, Boris Starobinets, Charles Long, Olga Kalashnikova, and Pinhas Alpert (2015), *International Journal of Remote Sensing*, 36:13, 3423-3445, DOI: 10.1080/01431161.2015.1060646.

In this research paper, the authors compared the occurrence of clouds (Cloud Fraction, CF) and aerosols (aerosol optical thickness, AOT) in the Northern and Southern Hemispheres, over the tropical Atlantic Ocean (30 degrees North to 30 degrees South). Several prior studies had not noted a significant *global* difference between the two hemispheres with respect to CF.

Because of the regular recurrence of dust storms originating from the Sahara Desert and the presence of the Intertropical Convergence Zone (ITCZ) north of the Equator, a difference in the quantities of CF and AOT between the hemispheres might be expected. The tropical Atlantic region had not been investigated previously to determine if an actual asymmetry existed.

The researchers determined that the presence of Saharan dust does indeed influence CF over the tropical Atlantic Ocean north of the Equator. The main data set used was the Modern Era-Retrospective Analysis for Research and Applications (MERRA) data, with added aerosol components (MERRAero). AOT data from the Multiangle Imaging Spectroradiometer (MISR) were used to verify the results obtained with MERRAero.

One interesting result is that the hemispheric difference peaks in July, when AOT is 10 times higher in the northern hemisphere. See Figure 7 from the paper at left, with caption below. The Saharan Air Layer (SAL) is a significant zone of cloud formation. Giovanni was used to examine the cloud droplet effective radius (R_{eff}), obtained from Moderate Resolution Imaging Spectroradiometer (MODIS) data. R_{eff} increased from east to west, as did precipitation, indicating that the cloud condensation nuclei (CCN) population was decreasing as dust settled out of the atmosphere. This change even caused the cloud types to be different from east to west, with "rain clouds" located in the west.

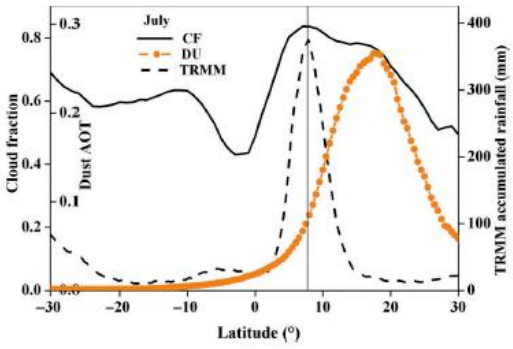


Figure 7. Meridional distribution of 10-year mean MODIS–Terra cloud fraction (CF), TRMM accumulated rainfall, and MERRAero dust AOT (DU), zonal-averaged over the Atlantic Ocean (60° W–0° E), in July. The near-equatorial maximum in meridional distribution of TRMM accumulated rainfall indicates the position of the North Atlantic Ocean Intertropical Convergence Zone (ITCZ).

New in Giovanni-4: many more color palettes!

One of the new features in Giovanni-4 is the capability to use a much bigger variety of color palettes for mapped data output. The color palettes in Giovanni-4 are considerably more restrained than were many of the very unusual ones found in Giovanni-3 (which originated with GrADS and IDL).

Now, simply by clicking on the *View All Palettes* button, when O*ptions* are selected after the initial generation of a data map, any of the available palettes can be selected. Several palettes can be added at the same time. Once the palettes are added, the desired palette can be chosen with the radio button, and the map can be re-plotted. Giovanni-4 will do the replotting quickly and generate a map with the new color selections. Note that a new color palette range and smoothing can also be done simultaneously.

There are several things to consider when choosing a color palette for effective data visualization. Two links below provide an introduction to this subject. We will be creating a Giovanni-4 "Guide to the Use of Color Palettes" to assist our user community with this aspect of Giovanni-4 usage.

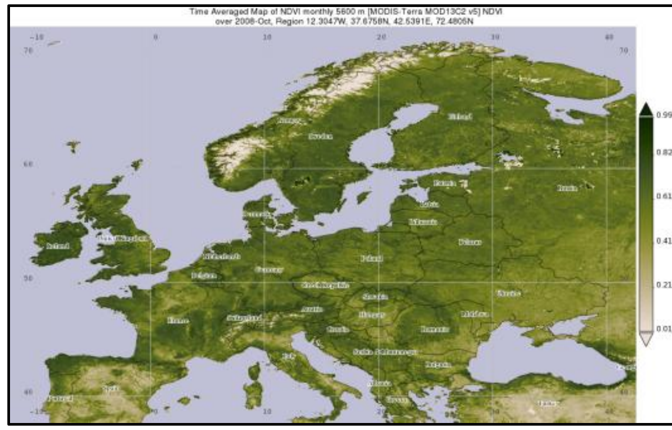
On the next page are examples of five different color palettes used with MODIS Normalized Difference Vegetation Index (NDVI) data acquired from our Federated Giovanni partner, the Land Processes Distributed Active Archive Center (LPDAAC), showing NDVI in Europe for October 2008.

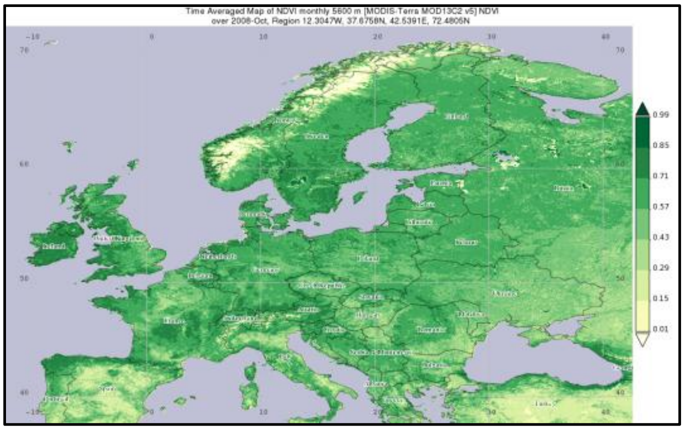
- Subtleties of Color – Part 3 (from the NASA Earth Observatory)
- How the Rainbow Color Map Misleads

Expand your horizons
by looking beyond them
with Giovanni

http://giovanni.gsfc.nasa.gov

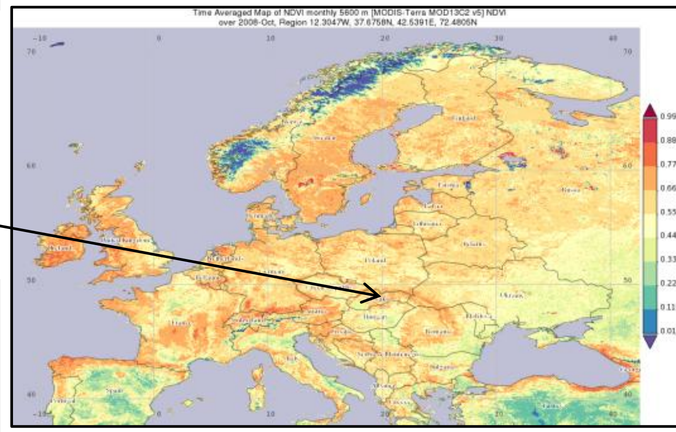
The Blue-Pink palette with 255 colors provides a very “natural” look for NDVI.

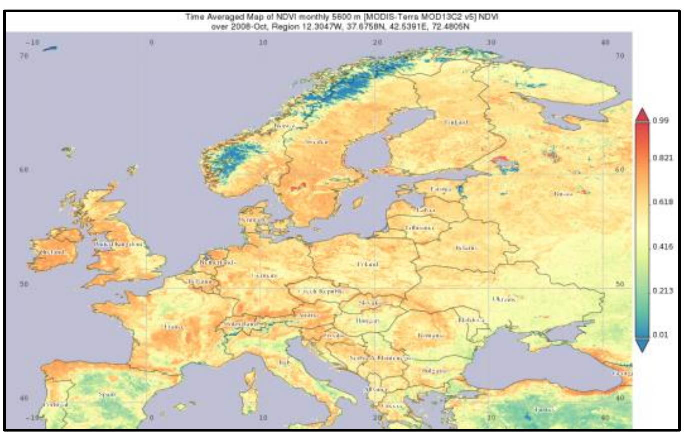


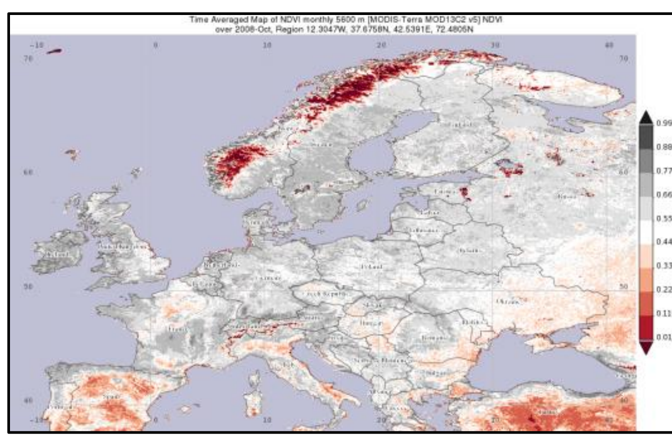


The Green-Yellow palette with 11 colors emphasizes the “greenness” of NDVI.

Blue-Yellow-Red spectral palette, with 11 colors (right) and 65 colors (below).
In this case, red emphasizes the denser vegetation cover. Note the Carpathian Arc.







This Gray-Red palette is very good for emphasizing areas with particularly low vegetative cover, particularly the rocky fjords, the high Alps, or semi-arid regions. Wetlands around Lake Ladoga, other parts of Eastern Russia, and on the Estonian border also stand out with this palette.